nign and curable intracranial tumor. When these findings or symptoms are present the tumor has usually reached massive proportions and cannot be removed without considerable risk. This is probably related to the very slow or stuttering nature of the growth process which permits the adjacent central nervous system structures to adapt or mold without alteration in function to the slow distortion caused by the tumor.

Therefore studies should be carried out in all patients who complain of unilateral hearing loss. While highly sophisticated neurootologic test facilities are not universally available, the always accessible telephone is a superb simple screening test for detection of sensory neural hearing disorders. Frequently an early clue is provided by the simple comparison of speech perception between the right and left ear.

Telephones provide simultaneous bone and air conduction as well as an index of speech perception. Disorders of speech perception are prominent indicators of sensory-neural hearing loss or conduction impairment in the 8th nerve, the most common early finding in acoustic tumors.

Contemporary microneurosurgical techniques now make possible total tumor removal with preservation of the 7th nerve in many cases and, in an ever-increasing number of cases, preservation of the cochlear division with useful hearing.

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Galactorrhea, Amenorrhea: An Algorithm

AN INCREASING NUMBER of patients with the syndrome complex of amenorrhea/galactorrhea are presenting to clinicians for further investigation. The development of a reliable immunoassay to assess the serum level of prolactin has enabled a greater understanding of the physiologic basis underlying this disorder in many patients. Once the diagnosis of hyperprolactinemia has been established one must pursue the potential underlying causes for this hormonal aberration. A detailed history will identify use of any of a number of pharmacological agents that may be responsible for this syndrome.

The most common cause of hyperprolactinemia relates to the use of oral contraceptives. If a patient has recently stopped using oral contraceptives or if galactorrhea develops during oral contraceptive use, withdrawal of the medication will generally result in resolution of the hyperprolactinemia within a period of two to three months. One must also consider a number of other pharmacological agents, including tranquilizers of the phenothiazine group and antidepressants. In general, discontinuation of these agents will result in resolution of the hyperprolactinemia.

If the hyperprolactinemia should persist or appears unrelated to any pharmacological agents, then one must consider a primary pituitary disorder as the underlying source. Prolactin levels in excess of 100 ng per ml are highly suggestive of a primary pituitary tumor as the underlying cause. The best subsequent test to evaluate the potential presence of a pituitary tumor is multidirectional or hypocycloidal polytomography, which will allow clear delineation of any deformation of the sella turcica. This study enables specific evaluation of distortion of the sella turcica by small intrasellar lesions. Upward projection of an intrasellar or suprasellar lesion (or both) is best evaluated by computerized tomographic scanning utilizing multiple overlapping cuts of the sella turcica and suprasellar cistern. Fractional pneumoencephalography or metrizamide cisternography may be desirable in equivocal cases. Clinical evidence for suprasellar extension may also be found by an in-depth evaluation of the visual axis using tangent screen visual field examination along with visual evoked response evaluation.

If these studies fail to show evidence of an intrasellar or suprasellar lesion, then administration of bromergocryptine will result frequently in resolution of the hyperprolactinemia and galactorrhea, with restitution of normal menses and fertility. This agent is not curative but is highly effective in suppressing the aberrant hormonal function.

If, on the other hand, evidence is obtained indicating the presence of a pituitary tumor, then transsphenoidal resection of the pituitary tumor has proved, within the past ten years, to be the most effective way to deal with this problem. This technique provides a mechanism for removal of the hyperfunctioning tumor under microscopic dissection while preserving normal adenohypophyseal and neurohypophyseal function.

Depending upon the underlying pathophysiologic process, excellent methods are available to

resolve the infertility associated with hyperprolactinemia. The ease of establishing the diagnosis by the readily available immunoassay of serum prolactin clearly opens a new and satisfying vista for the treatment of the amenorrhea/galactorrhea syndrome.

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Deep Brain Electrical Stimulation to Control Intractable Pain

INTRACTABLE PAIN presents as a clinical problem across the spectrum of clinical medical disciplines. Chronic pain of both malignant and nonmalignant causes results in disability, suffering and hardship for thousands of people every year. Recent developments have indicated that chronic pain might be controlled by electrical stimulation of an antinociceptive system which is located, in part, at the paramidline structures in close relation to the back of the 3rd ventricle and the aqueduct of Sylvius.

Investigators have produced profound analgesia in laboratory animals by electrical stimulation at the above deep brain locations. Moreover, investigators have shown that the same locations have stereospecific morphine receptor sites which are productive of analgesia with microinjections of opiates. An important link in this system was the discovery of encephalins, opiate-like polypeptides which are produced endogenously. Possibly, it is speculated, electrical stimulation of deep brain structures releases encephalins, thereby producing analgesia.

The first reports of deep electrode implantation in groups of patients with intractable pain have been favorable (75 percent to 80 percent of the patients have complete or satisfactory relief of pain) for the follow-up period (up to three years). It is now thought that electrical stimulation of the paramidline structures activates a serotoninergic descending dorsal lateral spinal pathway to inhibit spinal nociceptive neurons either directly or by the release of encephalins. The addition of L-tryptophan, a serotonin precursor, in high doses to patients' diet may improve the efficacy of deep brain stimulation for the treatment of chronic pain.

Deep electrode stimulation for the treatment of chronic pain is a promising new therapeutic technique for an old and frustrating problem. It is the clinical application of a technique founded on the basis of a large body of preliminary investigative development.

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